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THE MEASUREMENT AND IMPROVEMENT OF R&D MARKETING EFFECTIVENESS

Edward B. Roberts

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The Measurement and Improvement of R&D Marketing Effectiveness

by

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My talk today will treat in a few minutes of review what we have established at greater length in previous meetings. Next we shall describe some recent studies we have made in the attempt to measure research and development marketing effectiveness. Finally we shall discuss some means of improving a company's effectiveness in marketing its research and development activities.

PRIOR FINDINGS

Figure 1 shows the results of studies we made of two Department of Defense field centers in which a total of 90 R & D contract awards, formally competitive and above $100,000 in size, were examined. The plot shows a frequency distribution of the position of contract winners' names on the government's original non-alphabetical procurement request forms. These forms contain what the government technical initiator of the contract wrote out when he first started the formalities of the procurement process. These data are drawn from documents prepared six to eight months prior to the government agency's solicitation of industry, prior to its receipt of industry proposals, prior to the agency's evaluation of the proposals, and prior to the award of the R & D contracts. The point of the data is very clear; namely, the winners are usually those companies

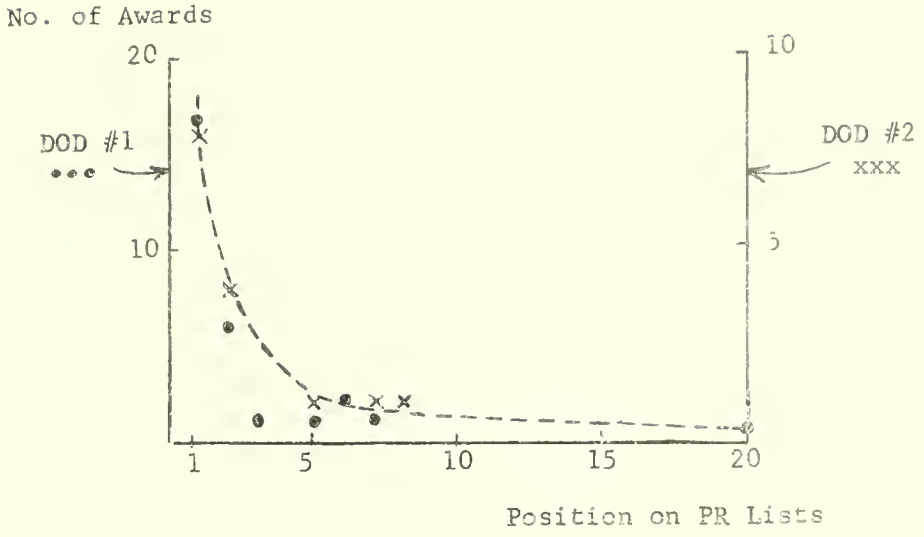

Figure 1. R&D Awards as a Function of Initiators' Preference Indications

that have done sufficient work with the government technical initiator of a research and development procurement to be listed first or second, or third perhaps, on his suggested source list. This win frequency occurs despite all the formal competitive activities that follow preparation of the original source list.[1]

Figure 2 reflects the processing of the award data one step further. This processing of the data is suggested by the fact that it is difficult for the government to award a contract to a company that is solicited to bid but in fact does not bid. By eliminating from the original source lists those companies that eventually did not bid for the job, we produce the results shown in Figure 2. There you see a more sharply defined indication that if you were both preferred by the government initiator and

[1] I might refer you to Adaptability for Survival in the Defense Industries, the proceedings of last year's conference here at Boston College, for broader details of this study. My paper is titled "Marketing and Engineering Strategies for Winning R&D Contracts".

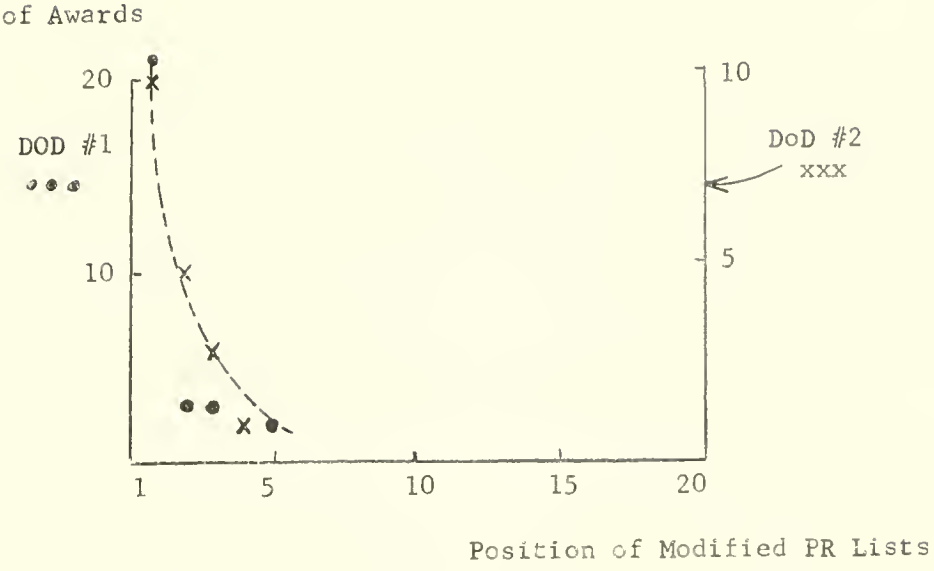

Figure 2. R&D Awards as a Function of Initiators' Preference Indications, Dropping No-Bidders from Lists

you also were smart enough to bid on the job, you had even a better probability of winning the contract.

One other thing that we established in prior studies mentioned last year is that large differences exist between characteristics of winners and losers on the same sets of R&D competition. These differences were established by questionnaire study of 1100 companies solicited to bid on 45 R&D award competitions. Simply stated some of the results were as follows:

1) Winners had done far more prior contractual work with the government agency.

2) Winners had submitted more prior unsolicited proposals.

3) Winners did not think that the procurement belonged to somebody else.

4) Winners did frequently think that the procurement tended to belong to them.

5) Winners knew the technical initiator.

6) Winners contacted the initiator after receiving the RFPs but before submitting their proposals.

7) Winners felt they had an advantage over their competition.

8) Winners reflected customer technical preferences in their proposals.

9) Winners directed their proposals at particular individuals in the organization.

10) And the winners, incidentally, did not particularly use technical writers in the preparation of their proposals.

Now all of these are statistically significant differences distinguishing the winners of R&D contracts in general from losers. The losers evidenced the inverse of all of these characteristics.

As a result of these studies it becomes rather clear that research and development contract awards are largely based upon person-to-person contact between the technical people of contractor organizations and the technical people of the government organizations. These personal contacts are spread over a long period of time well in advance of the requests for proposal. Moreover, they are even well in advance of the government initiator's beginning of the formal process that eventually leads to a request for proposal. Thus winning reflects not merely doing "homework" in anticipation of an RFP. By the time the government believes a research and development need exists that should be fulfilled under contract, the winning company is usually being considered earnestly by the technical initiator

as one of the few firms qualified and capable of fulfilling his needs The accumulation of the data we have organized in the past several years indicates that these findings apply at least to most R&D contracts of up to one or two million dollars in size. The situation is probably less true, although I think the principles are still true, for contracts above a few million dollars in size.

Given the theme of this conference, I would observe that one changing boundary of the defense industry in the next five years is in the area of competition for research and development contracts. From insights gained during extensive lecturing and consulting work with a large number of companies in the defense industry, I observe that more and more companies perceive the determinants of research and development awards that we have been discussing this morning. These companies will more clearly reflect these factors in their strategies and tactics for winning research and development contracts. The R&D competition will become even tougher than it has been as more companies manifest more intelligent competitive practices.

Some of you may regret having your competition learn what you think you have known all along. On the other hand, the next set of data we shall present suggests that perhaps you have not really known these facts sufficiently well to have them evidenced in your behavior. There seems to be a considerable difference between what you know in the back of your minds and what you do when you make funding and manpower allocations and bid or no-bid decisions

MEASUREMENTS OF R&D MARKETING EFFECTIVENESS

I should now like to report on some recent research in which we have obtained various measures of research and development marketing effectiveness. During the past year with the important assistance of two of my research assistants, Norman Kneissler and Mark Ramsaier, we carried out a series of comparative analyses of the R&D marketing strategies and effectiveness of nine companies. The firms are located along the eastern seaboard between Washington and New Hampshire, range in size from several millions of dollars in sales to several hundred million dollars, and generally but not exclusively are in the electronic systems or related businesses. In the nine companies we were again concerned with the same kinds of competitions that we have examined in the past: namely, formally competitive procurements for new R&D business--not for follow-on, not for production, but for research and development--that involved over $100,000 in the award or in this case in the bid amount of the companies. We did not restrict the sample by government agency nor by whether the jobs were classified or unclassified. In the nine companies, we studied a total of 121 competitions.

In Table 1 we have displayed for the nine companies, companies M through U, the numeric capture ratios achieved in the competitions studied. This ratio is what many companies use as a principal measure of marketing effectiveness. It is merely the ratio of the number of jobs that the company bids to the number of jobs obtained. This measure of marketing effectiveness is usually referred to as the win ratio. You will note the significant difference between Company M - the first ranked company in terms of this ratio - and Company N - the second ranked company

Table 1.

NUMERIC CAPTURE RATIOS

COMPANY	# WON	# BID	RATIO	RANK
M	6	10	.60	1
N	7	22	.31	2
O	1	18	.06	7
P	3	15	.20	4
Q	1	4	.25	3
R	1	10	.10	6
S	2	12	.17	5
T	0	13	0	8
U	0	17	0	9
			AVG.= .17	

on this measure. The first ranked company won 60 percent of those formal R & D competitions for new business that were over $100,000 in size. They bid ten and won six. The second ranked company on this measure of effectiveness only won half as many, 31 percent.

Please note that the striking difference between Company M (No. 1) and Company N (No. 2) is much greater than the difference between any two of the other companies. The third ranked company won 25 percent, the fourth ranked company won 20 percent, the fifth ranked won 17, then 10, then 6, and a couple of companies, of course, out of 13 and 17 competitions in this size range respectively, won no competition. This difference is something with which you should be concerned.

Secondly, you should note the average measure. For nine companies that reflect as well as any other grouping might the composition of the companies represented in this audience, the average numeric win ratio was 17 percent, or about one out of six of their competitions were won. Remember that we are talking about new business, formal competition, research and development, over $100,000 in size. This figure gives you some perspectives on some of your competitors.

Another measure that many of you use probably an intelligent measure, is the dollar capture ratio. It is important to consider not only what percentage of the jobs you bid on that you won, but also what percentage of the money that you are trying to get that you do get. Here in Table 2

Table 2.

DOLLAR CAPTURE RATIOS

COMPANY	No of Competitions in Sample	$ WON (000)	$ BID (000)	RATIO	RANK
M	9	1,044	2,561	.41	1
N	22	2,750	20,573	.13	2
O	18	480	3,474	.12	3
P	15	912	10,981	.08	4
Q	4	150	2,766	.05	5
R	10	245	5,110	.05	6
S	12	300	9,234	.03	7
T	13	0	5,353	0	8
U	15	0	5,919	0	9
				AVG.= .09	

we chart the dollars bid by the nine companies against the dollars that they won. Here we show the ratios of dollars won to dollars bid for these nine companies arrayed in rank order. Again note the difference between Company M and its dollar win ratio of 41 percent (that is, in dollar terms it won 41 percent of the dollar bids that it extended) versus the second company in line which won only 13 percent. Companies below them won, respectively, 12, 8, 5, 5, 3, and zero percent. Every company below No. 1 won a much smaller percentage of the dollars sought in the competitions: the average wins for all of the companies was only 9 percent of the dollars that they tried to get.

We can observe that 17 percent of the jobs bid were won, producing only 9 percent of dollars bid. Obviously, these companies in general are losing out on the larger contracts for which they are bidding, they are winning a larger percentage of the smaller contracts they are bidding. This situation is reasonable for our area of the country. The eastern seaboard that we studied is not the home of those companies getting most of the very large defense procurements. The larger contracts are tending to go to the West Coast or to other areas of the country not included in our sample.

Our final success measure that seems of possible interest is the return on proposal investment. All of us are familiar with return on investment criteria as usually applied in manufacturing. Too seldom do we worry about return on proposal investment criteria for application to the marketing of research and development. The return on proposal investment is being measured relatively simply: dollars spent on preparing proposals in relation to dollars won by these companies. (Here again we are concerned with new business competitions for R&D work, formally competitive, over $100,000 in size.)

Table 3 shows what we found. In terms of dollars won relative to the proposal dollars spent to win these dollars (the Return on Proposal Investment Factor), the first ranked company won 27½ times the dollars that it spent to win. This is not to say that the company profited by this success factor. If we apply a six percent profit factor to the direct dollars won, this company comes out just a little in the black; that is, estimated profits on the contracts won slightly exceed the proposal dollars that the company spent to win these contracts. Of course, proposal dollars do not

Table 3.

RETURN ON PROPOSAL INVESTMENTS

COMPANY	No. of Competitions in Sample	$ Won (000)	PROP. $ (000)	FACTOR	RANK
M	9	1,044	38	27.5	1
N	21	2,305	381	6.1	4
O	11		*		7
P	13	813	258	3.2	5
Q	4	150	14	10.7	2
R	10	245	171	1.4	6
S	12	300	38	7.9	3
I	10	0	46	0.0	8
U	13	0	83	0.0	9

AVG. = 4.7

* Incomplete information

usually come out of profits in the defense industry, so we need never make that kind of comparison. But if you were a private investor in a private investment situation, you would worry about profit dollars relative to proposal expenditures rather than just sales dollars.

Again, look at the difference between the No. 1 and the No. 2 companies. No. 2 won in dollars 10.7 times what it spent on proposals to get its contracts. (One company's cost data were so poorly organized that we decided to leave it out.) But note the average of all companies: 4.7 times the dollars that they spent on proposals was all that they won in contracts. Now let us turn this around. It means that these companies spent 22 percent of their "winnings" in proposal preparation alone to get the business. Now these facts do not jibe with what people commonly tell us about R & D proposal costs amounting to two to three percent of sales. Why do the "facts" not jibe? The answer is simple: Because we are here measuring specific costs--total money spent to produce specific

sales. We exclude all spillover effects of follow-on, of sole-source procurements, and so on--where companies do not spend much money to get the business. In my opinion we should be looking at the proposal cost to sales captured as a measure of effectiveness of the marketing and engineering strategy in the company. The more grandiose measures do not examine the tit-for-tat relationship of what did I get for what I spent. The grandiose measures mask the whole relationship by adding somewhat irrelevant considerations--the sole source business that often does not relate to the competitive proposal efforts and the follow-on business that does not directly relate to the original proposal efforts. We get a much different measure when we look at dollars spent for dollars won in comparable cases.

In Table 4 we list for all companies their ranks according to the three different measures: dollar capture ratio, numeric capture ratio, and return on proposal investment. These, of course, are not independent measures. In general, the relationships are highly correlated: that is, there is a .8 correlation between dollar capture ratio and numeric capture ratio; a .92 correlation coefficient between numeric capture ratio and return on proposal investment; and a .61 relationship between dollar capture ratio and the return on proposal investment. This does not say that for any given company, rankings on any of these given measures are necessarily the same. It indicates that in general if you are evaluating an array of competitive companies, each of these three measures tends to give you a closely related ranking of competitive success.

Table 4.

COMPARISON OF COMPETITIVE SUCCESS MEASURES

RANKINGS

COMPANY	$ Capture Ratio	Numeric Capture Ratio	Return on Proposal Investment
M	1	1	1
N	2	2	4
O	3	7	7
P	4	4	5
Q	5	3	2
R	6	6	6
S	7	5	3
T	8	8	8
U	9	9	9

CORRELATIONS .80** .92** .61*

(Significance levels: **.01; *.05)

STRATEGY DIFFERENCES IN R&D MARKETING

Given these three measures we now split the sample of companies into high and low performing groups. For each of the three measures separately we took those companies that were high in performance, generally above the mean, as one group. Those companies that were low in performance--namely below the mean as a company--became a second group. We then compared the higher performing companies as a group with the low performing companies to see if we might document some of the real differences in their R&D marketing strategies and tactics. Employing the same kinds of questions we have been using in past studies, we found several of the relationships to be statistically significant. Differences between the high and low company groups show up, for example, in the areas of anticipation of request for proposal, knowledge of the initiator of the procurement, prior con-

tractual work with the organization, and knowledge of the funding of the government organization. In these instances the higher performing companies tended to know significantly more than did the lower ranking companies

But a key finding is that all of the relationships that were significant, all of the meaningful differences between the high and the low companies, were in activities that preceded receipt of the request for proposal...not in those that followed receipt of the RFP. In terms of activities, strategies and decisions that followed receipt of the requests for proposal, no factor led to a significant distinction between the high performing companies and the low performing companies. This is really the same that we have learned previously in our research studies of individual R&D procurements, as well as in our examination of the general differences between winners and losers in a number of competitions. Now we have found the same kind of conclusion in looking at companies as a whole in terms of the aggregate of their new business activities. The high performing companies are significantly different from the low performing companies principally in what they do and what they know before they receive formal requests for R&D proposals. I think this is something you ought to contemplate when you try to design new strategies for improving your company's R&D marketing effectiveness.

All of the above, what we presented last year at this conference as well as the data that we have gathered in the past year, reflect the importance of what I have called a contact orientation, as opposed to a proposal orientation. When the organization is person-to-person contact oriented, when it believes in this approach and follows it through con-

sistently over a long period of time, this behavior tends to be reflected in the company's overall performance both in individual contracts and in general company-against-company comparisons. Yet our recent comparative analyses also resulted in an inability to categorize any of the nine companies studied consistently in terms of its practice of one or the other orientation. In particular, despite the relatively high performance of some of the companies that we looked at, no company clearly and consistently followed a policy and practice of adhering to the contact orientation in the way it went about carrying out it's business marketing activity. This to me seems rather disappointing and discouraging about the defense industry in this geographical area. Although we now have so much evidence gathered in so many different ways that suggest the strength and importance of contact orientation, we cannot find a single company that exhibits that kind of an orientation consistently in all of the competitions in which it engages. (By the way, I do call attention to the fact that we did find such consistency in a small research organization in New Jersey that we studied three years ago when we were testing out our research procedures. But this firm was not included among the larger R & D oriented companies that were studied in our recent comparative sample.)

IMPROVEMENT OF R&D MARKETING EFFECTIVENESS

Let me turn with this to the final sector of the talk, namely improving R & D marketing effectiveness. The first point that I should like to make is that he who doesn't study history is doomed to repeat it. There is a great need for self study in the defense industry, particularly in

the marketing area. Perhaps the self study needs to be aided by the same kinds of systems analysts or other forms of expertise that your companies gather to look at other people's problems. You have your own problems within the industry: you ought to be analyzing yourselves and your performance. If you don't begin to engage in more self analysis, you are bound to maintain the same record of what I believe to be mediocre marketing performance that you have had in the past.

My second point from all of these studies is that it appears important that more logical and more rational procedures and policy for bid, no-bid decisions must be devised and must be effected in your companies. Companies are bidding far too many jobs that they have no business bidding. I say this while fully recognizing the many non-win oriented reasons for bidding R & D contracts. I know about "attempting to gain exposure to a government agency"; I know about "buying a ticket to get in to talk to the initiators later"; and the many other reasons your companies give when you bid jobs you have little chances of winning. It is still my conviction that more rationality must be applied to the bid, no bid decision-making area.

Thirdly, I think that there is a need for more integrated funding and decision making among the areas of company sponsored in-house research and development, government sponsored in-house R&D, as well as proposal activities. Furthermore, all of these ought to be tied to company plans and company objectives. From my observation of a large number of companies in New England and elsewhere in the country, I conclude that too few companies in the defense industry have clearcut objectives and plans. They therefore have no basis against which to make integrated funding or

proposal decision making in many of the perplexing cases they must face up to. Each bid, no-bid case seems to be an ad hoc situation for creative decision making, not something that can be decided on and followed through repeatedly in a consistent manner.

Fourth, I think all our evidence proves clearly the need for far more concentration on the early phases of R&D competition, what we might even call the pre-competition phase. The emphasis should occur in the phase that precedes the RFP, in fact in the phase that really precedes the technical initiator in government beginning to decide that he has work that ought to be done under outside contract.

Fifth, there is a need for, I think there is almost an absence in industry of, effective marketing analysis information systems aimed at management decision making. A company loses the information content it has in its experience if it does not have the kind of recall, evaluation, and analysis capabilities needed today. Your firms need systems to adequately use the information that your own business activities from day to day are generating. This is not to say you need better intelligence systems on future jobs or your competition. You need better in-house information analysis systems to analyze what your experience is currently telling some of you intuitively, but far too few of you.

Finally, I think that engineers in particular (marketing people, too, but engineers in particular) need to be educated in these insights into the determinants of research and development awards and R&D marketing effectiveness. When you have decentralized responsibilities in an organization, as inevitably you must have in a technical organization of professional people, you have to depend on the individual engineer to

make many key marketing oriented decisions He must know what is right and what really matters in the area of R&D competition You won t be able to use tight rules and regulations as laws for enforcing no bid constraints under one circumstance or another Should you ever attempt to set up such regulations, the technical people who want to bid a job will manage to confuse and confound their enforcement

Instead you are going to require an across-the-board educated approach to this orientation The engineers need to understand and believe these facts of the R&D marketplace so that they will discipline themselves. This is not to say that you should have anarchy in your companies The marketing organization should attempt whenever it can to emphasize a person-to-person contact orientation while it continues to educate But you will need much more widespread education of the technical people into what all of these marketing understandings suggest before you achieve that elusive paradise in which every engineer thinks, at least some of the time, like a marketing man

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